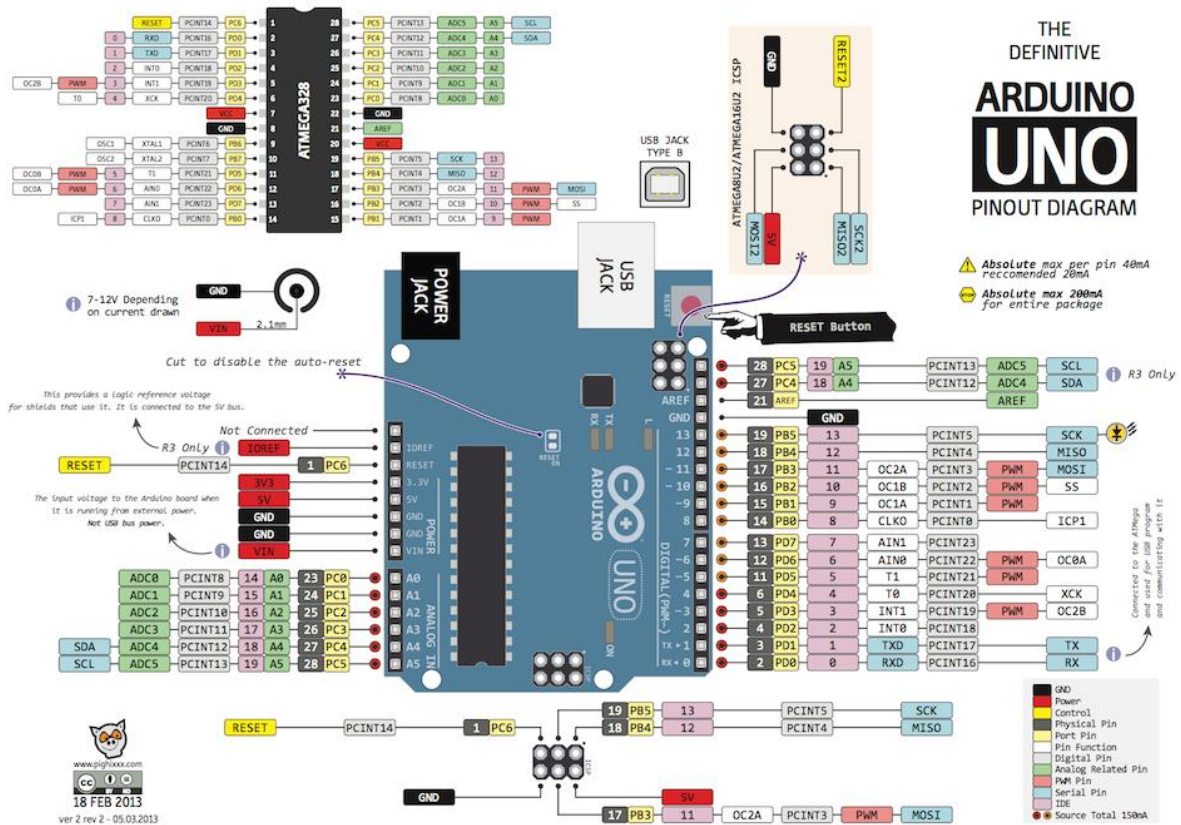


4CS016 Embedded Systems Programming Workbook 4



<http://marcusjenkins.com/arduino-pinout-diagrams/>

Contents

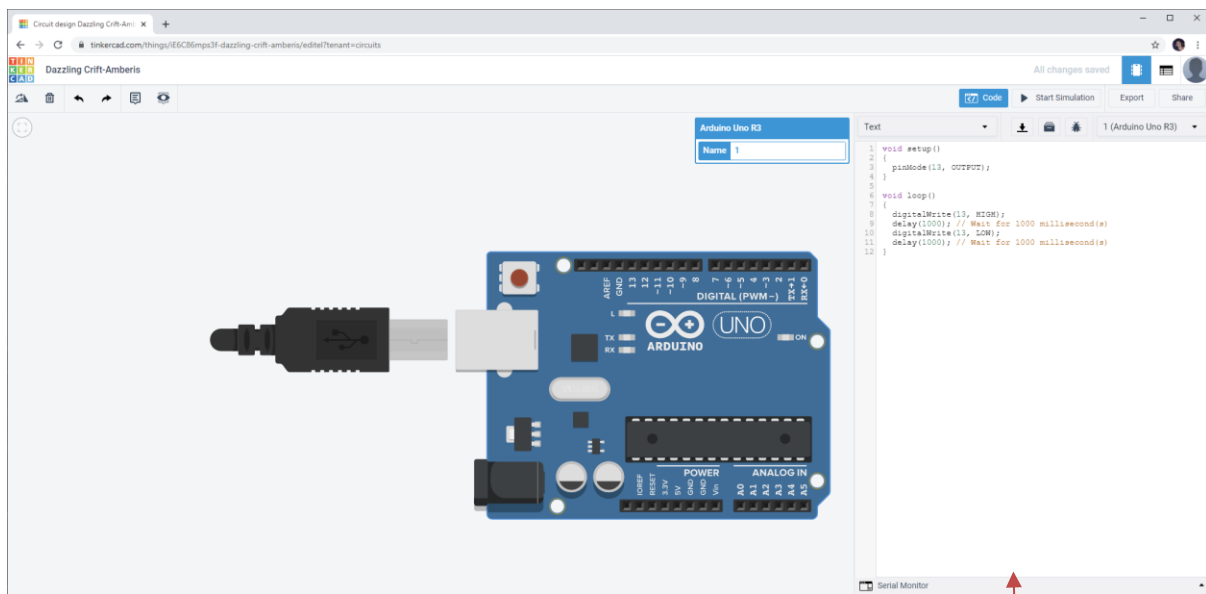
4CS016 Embedded Systems Programming Workbook 4	1
Introduction	3
Lab 1. Getting Started with the Serial Port	4
Complete Activity 4.1 of the Portfolio	4
Lab 2. Digital Inputs & the Serial Port	5
Complete Activity 4.2 of the Portfolio	5
Lab 3. Analogue Inputs & the Serial Port	6
Complete Activity 4.3 of the Portfolio	6
Lab 4. Temperature Sensor & the Serial Port	7
Complete Activity 4.4 of the Portfolio	7

Introduction

This workbook complements the lectures for 4CS016 as such, the lecture notes will be referred to as the work progresses. You will also need to complete portfolio activities as you progress, these are highlighted as you go along.

For TinkerCAD users

Click Code (Select Text)



Then to use the Serial output select Serial Monitor at the bottom.

Lab 1. Getting Started with the Serial Port

Step 1. Start a new Sketch project.

Step 2: begin the Serial port in the setup() loop (as in the lecture)

Step 3: Send your Student Name and Number stored as variables from the Arduino to the Serial Port, whenever a switch is pressed

Step 4: Open up the Serial Monitor

Step 5: Observe the results and capture a screenshot for your portfolio.









Complete Activity 4.1 of the Portfolio

End of Lab 1

Please continue with Lab 2

Lab 2. Digital Inputs & the Serial Port

Step 1: Wire up 8 switches

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1
							
Button 8	Button 7	Button 6	Button 5	Button 4	Button 3	Button 2	Button 1

Treat them as binary values, then based on the eight bit binary value write code to write out the decimal equivalent to the Serial Port

If using Tinkercad use these switches instead



Make sure you label up the value to provide meaningful identification thus making data ... information.

So for example

The Binary equivalent of "XXXXXXXX" of is "XX" in Decimal

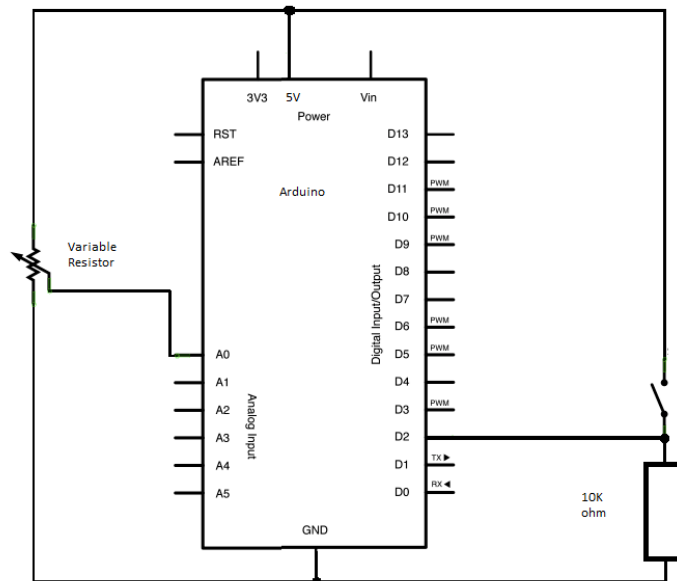
Complete Activity 4.2 of the Portfolio

End of Lab 2

Please continue with Lab 3

Lab 3. Analogue Inputs & the Serial Port

Step 1: Wire up the circuit shown in the lecture entitled “Reading an Analogue pin value & Send it via Serial (USB)”



Step 2: Test it to ensure it works.

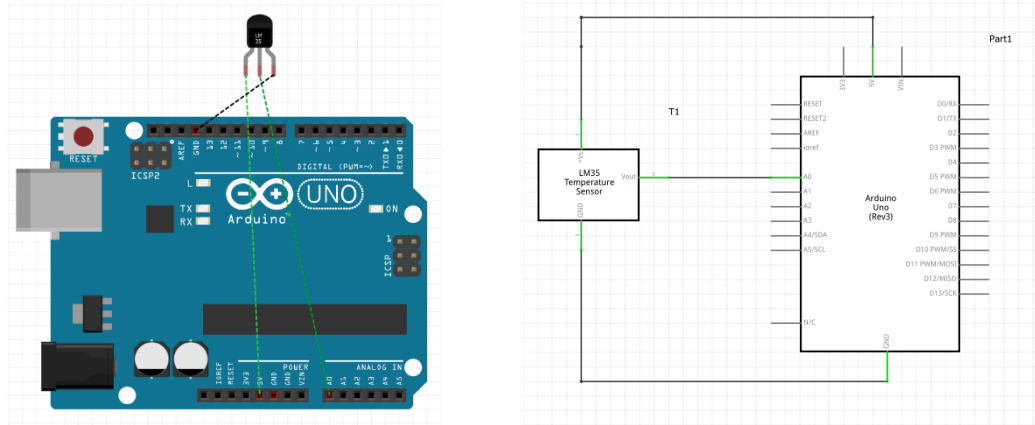
Step 3: Amend the program to display an approximate resistance instead of voltage, remember we will need to do a few things:

1. Measure the Potentiometer resistance at both the clock wise and anti-clock wise position.
2. Take several readings as we go along and check the voltage displayed against the resistance of the Pot.
3. Calibrate your code to display an approximate value of resistance.
4. Produce meaningful output in the serial window.

Complete Activity 4.3 of the Portfolio

Lab 4. Temperature Sensor & the Serial Port

Step 1: Wire up the circuit from the lecture and ensure it works.



Step 2: Add a switch to the circuit that when pressed displays a Fahrenheit value instead.

Complete Activity 4.4 of the Portfolio